

CLAIMS

What is claimed is:

- 1 1. A method for transforming a hypermedia document containing
2 main content and auxiliary data, the method comprising:
3 converting the hypermedia document into a string containing a
4 plurality of first values and a plurality of second values, the plurality of
5 first values corresponding to a plurality of formatting code segments
6 within the hypermedia document and the plurality of second values
7 corresponding to a plurality of text segments within the hypermedia
8 document;
9 applying a low-pass filter to the string containing the plurality of
10 first values and the plurality of second values; and
11 determining location of the main content within the hypermedia
12 document using an output of the low-pass filter.
- 1 2. The method of claim 1 further comprising:
2 coding the main content in a mobile device language for display on
3 a mobile device.
- 1 3. The method of claim 1, wherein the hypermedia document is a file
2 written in any one of a hypertext markup language (HTML), a dynamic

3 HTML, an extensible HTML (XHTML), an extensible markup language
4 (XML), JavaScript, and Visual Basic (VB) script.

1 4. The method of claim 1, wherein converting the hypermedia
2 document further comprises:
3 parsing the hypermedia document to identify the plurality of
4 formatting code segments and the plurality of text segments within the
5 hypermedia document;
6 assigning a first value to each character within the plurality of
7 formatting code segments; and
8 assigning a second value to each character within the plurality of
9 text segments.

1 5. The method of claim 4 further comprising truncating a length of
2 one of the plurality of formatting code segments when the length of said
3 one of the plurality of formatting code segments exceeds a threshold tag
4 length value.

1 6. The method of claim 1, wherein each of the plurality of first values
2 is equal to zero.

1 7. The method of claim 1, wherein each of the plurality of second
2 values is equal to one.

1 8. The method of claim 1, wherein the low-pass filter is a moving
2 average filter.

1 9. The method of claim 8, wherein the output of the low-pass filter
2 represents a distribution of text density over the hypermedia document.

1 10. The method of claim 9, wherein determining the location of the
2 main content further comprises:
3 searching an output of the low-pass filter to find a position of a
4 central peak corresponding to the highest text density within the
5 hypermedia document; and
6 determining a starting position of a high text density area and an
7 ending position of the high text density area using the position of the
8 central peak and a threshold text density value.

1 11. The method of claim 10, wherein the threshold text density value is
2 determined empirically.

1 12. The method of claim 1 further comprising:

2 varying the second value for one of the plurality of text segments
3 based upon a weight associated with said one of the plurality of text
4 segments.

1 13. The method of claim 1, wherein applying the low-pass filter further
2 comprises:

3 applying a median filter to the string containing the plurality of
4 first values and the plurality of second values to suppress high frequency
5 signal oscillations associated with the string; and

6 applying a moving average filter to an output of the median filter
7 to combine a plurality of closely spaced text segments contained in the
8 output of the median filter into a set of larger text segments.

1 14. The method of claim 13, wherein determining the location of the
2 main content further comprises:

3 applying a rising and falling edge detector to an output of the
4 median filter to identify the largest reasonably contiguous text segment
5 within the set of larger segments.

1 15. The method of claim 14, wherein the largest reasonably contiguous
2 text segment is identified using a threshold text value.

1 16. An apparatus for transforming a hypermedia document containing
2 main content and auxiliary data, the apparatus comprising:
3 a converter to convert the hypermedia document into a string
4 containing a plurality of first values and a plurality of second values, the
5 plurality of first values corresponding to a plurality of formatting code
6 segments within the hypermedia document and the plurality of second
7 values corresponding to a plurality of text segments within the
8 hypermedia document;
9 a low-pass filter to apply to the string containing the plurality of
10 first values and the plurality of second values; and
11 a location calculator to determine location of the main content
12 within the hypermedia document using an output of the low-pass filter.

1 17. The apparatus of claim 16 further comprising:
2 an encoder to code the main content in a mobile device language
3 for display on a mobile device.

1 18. The apparatus of claim 16, wherein the hypermedia document is a
2 file written in any one of a hypertext markup language (HTML), a
3 dynamic HTML, an extensible HTML (XHTML), an extensible markup
4 language (XML), JavaScript, and Visual Basic (VB) script.

1 19. The apparatus of claim 16 further comprising a parser to identify
2 the plurality of formatting code segments and the plurality of text
3 segments within the hypermedia document.

1 20. The apparatus of claim 16 wherein the converter is to convert the
2 hypermedia document by assigning a first value to each character within
3 the plurality of formatting code segments and assigning a second value to
4 each character within the plurality of text segments.

1 21. The apparatus of claim 20 wherein the converter is to truncate a
2 length of one of the plurality of formatting code segments when the length
3 of said one of the plurality of formatting code segments exceeds a
4 threshold tag length value.

1 22. The apparatus of claim 16, wherein each of the plurality of first
2 values is equal to zero.

1 23. The apparatus of claim 16, wherein each of the plurality of second
2 values is equal to one.

1 24. The apparatus of claim 16, wherein the low-pass filter is a moving
2 average filter.

1 25. The apparatus of claim 24, wherein the output of the low-pass filter
2 represents a distribution of text density over the hypermedia document.

1 26. The apparatus of claim 25, wherein the location calculator is to
2 determine the location of the main content by searching an output of the
3 low-pass filter to find a position of a central peak corresponding to the
4 highest text density within the hypermedia document, and by
5 determining a starting position of a high text density area and an ending
6 position of the high text density area using the position of the central peak
7 and a threshold text density value.

1 27. The apparatus of claim 1 wherein the converter is to vary the
2 second value for one of the plurality of text segments based upon a weight
3 associated with said one of the plurality of text segments.

1 28. The apparatus of claim 16, wherein the low-pass filter further
2 comprises:
3 a median filter to be applied to the string containing the plurality of
4 first values and the plurality of second values to suppress high frequency
5 signal oscillations associated with the string; and

6 a moving average filter to be applied to an output of the median
7 filter to combine a plurality of closely spaced text segments contained in
8 the output of the median filter into a set of larger text segments.

1 29. The apparatus of claim 28, wherein the location calculator is to
2 determine the location of the main content by applying a rising and falling
3 edge detector to an output of the median filter to identify the largest
4 reasonably contiguous text segment within the set of larger segments.

1 30. The apparatus of claim 29, wherein the location calculator is to
2 identify the largest reasonably contiguous text segment using a threshold
3 text value.

1 31. A medium readable by a machine, the medium having stored
2 thereon a sequence of instructions which, when executed by the machine,
3 cause the machine to:

4 convert the hypermedia document into a string containing a
5 plurality of first values and a plurality of second values, the plurality of
6 first values corresponding to a plurality of formatting code segments
7 within the hypermedia document and the plurality of second values
8 corresponding to a plurality of text segments within the hypermedia
9 document;

10 apply a low-pass filter to the string containing the plurality of first
11 values and the plurality of second values; and
12 determine location of the main content within the hypermedia
13 document using a low-pass filter output.

1 32. A method for transforming a web page containing main content
2 and auxiliary data, the method comprising:

3 converting the web page into a string containing a plurality of first
4 values and a plurality of second values, the plurality of first values
5 corresponding to a plurality of formatting code segments within the web
6 page and the plurality of second values corresponding to a plurality of
7 text segments within the web page;

8 applying a moving average filter to the string containing the
9 plurality of first values and the plurality of second values to generate an
10 output representing a distribution of text density over the web page;

11 searching the output of the moving average filter to find a position
12 of a central peak corresponding to the highest text density within the web
13 page;

14 determining a starting position of a high text density area and an
15 ending position of the high text density area using the position of the
16 central peak and a threshold text density value to determine location of
17 the main content within the web page; and

18 coding the main content in a mobile device language for display on
19 a mobile device.

1 33. The method of claim 32 further comprising truncating a length of
2 one of the plurality of formatting code segments when the length of said
3 one of the plurality of formatting code segments exceeds a threshold tag
4 length value.

1 34. The method of claim 32, wherein each of the plurality of first values
2 is equal to zero and each of the plurality of second values is equal to one.

1 35. The method of claim 32 further comprising:
2 varying the second value for one of the plurality of text segments
3 based upon a weight associated with said one of the plurality of text
4 segments.

1 36. A method for transforming a web page containing main content
2 and auxiliary data, the method comprising:
3 converting the web page into a string containing a plurality of first
4 values and a plurality of second values, the plurality of first values
5 corresponding to a plurality of formatting code segments within the web

6 page and the plurality of second values corresponding to a plurality of
7 text segments within the web page;
8 applying a median filter to the string containing the plurality of
9 first values and the plurality of second values to suppress high frequency
10 signal oscillations associated with the string;
11 applying a moving average filter to an output of the median filter
12 to combine a plurality of closely spaced text segments contained in the
13 output of the median filter into a set of larger text segments;
14 applying a rising and falling edge detector to an output of the
15 median filter to identify the largest reasonably contiguous text segment
16 within the set of larger segments using a threshold text value, the largest
17 reasonably contiguous text segment corresponding to the main content of
18 the web page; and
19 coding the main content in a mobile device language for display on
20 a mobile device.

1 37. The method of claim 36 further comprising truncating a length of
2 one of the plurality of formatting code segments when the length of said
3 one of the plurality of formatting code segments exceeds a threshold tag
4 length value.

1 38. The method of claim 36, wherein each of the plurality of first values
2 is equal to zero and each of the plurality of second values is equal to one.

1 39. The method of claim 36 further comprising:
2 varying the second value for one of the plurality of text segments
3 based upon a weight associated with said one of the plurality of text
4 segments.

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